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TRANSLATION OF THE DEPARTMENT OF DEFENSE DISEASE AND INJURY COD--ETC(U)
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TRANSLATION OF THE DEPARTMENT OF DEFENSE DISEASE AND INJURY CODES TO THE EIGHTH REVISION INTERNATIONAL CLASSIFICATION OF DISEASES FOR USE BY THE MILITARY SERVICES

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BETHESDA, MARYLAND

Translation of the Department of Defense Disease and Injury Codes to the Eighth Revision International Classification of Diseases for Use by the Military Services*

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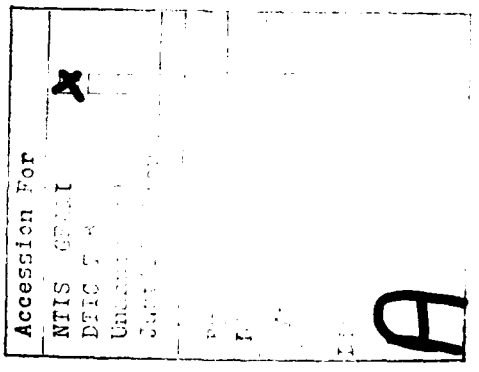
Systems of disease classification are essential for orderly medical record keeping and epidemiological research. The London Bills of Mortality were used in the 17th century by Graunt to evaluate childhood mortality,[1] and this endeavor represented the first attempt to quantify the toll taken by various diseases. At the first International Statistical Congress held in Brussels in 1853, Drs. William Farr and Marc d'Espine were requested to prepare a classification of diseases for international usage.[2] Multiple revisions of this early coding system have been made and its descendent, the Eighth Revision International Classification of Diseases Adapted for Use in the United States (ICDA-8),[3] is currently in use throughout this country.

The U.S. Armed Forces adopted this classification of diseases in January 1970. Prior to that time, disease classification in the military had followed its own line of development. The Navy provides one example. In 1919 the Department of the Navy developed the Nomenclature of Diseases and Injuries,[4] and, since that first publication, eight revisions have been issued.[5-12] The



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latest military disease coding system to be used, from 1963 until the adoption of the ICDA-8, was the Department of Defense Disease and Injury Codes (DDDIC).[12]

Transition from the use of one coding system to another has caused serious problems for the clinician reviewing the patients' health records, for the medical record historian desiring a unified coding system, and for the researcher attempting to pursue record review studies. A translation of one coding system into the other has been needed.

At the Naval Health Research Center we are involved in epidemiological and longitudinal studies involving the use of computer-stored data concerning active duty personnel hospitalized in naval facilities. Such research necessitated the development of a DDDIC/ICDA-8 translation. Previously one of the authors reported in this journal the development of a translation of the Mental Disorder sections of the two coding systems.[13] The purpose of this paper is to report on the further development of a translation for all medical disorders, accidents, and other conditions.

Problem and Method

Problem

The DDDIC is a classification system consisting of 3,213 diagnostic entities in 18 systems. Ten systems are organized with regard to anatomy; other systems classify Infections, Neoplasms, Mental Disorders, Congenital Malformations, Accidents, and Diseases of Early Infancy. Another system classifies Symptoms, Senility, and Ill Defined Conditions. The DDDIC also contains "Supplementary Classifications for Special Cases, Live Births and

Fetal Deaths." The Special Cases section describes such things as Fitting of Dental Prosthetic Device.

The ICDA-8 contains 3,206 entities also divided into 18 systems. Ten systems are organized with regard to anatomy, and the others are organized in a manner similar to that of the DDDIC. However, in the ICDA-8 two systems are used to describe accidents rather than one as in the DDDIC. The first accident coding system describes the nature of the injury, as for example, Fracture of Humerus. The second category, seldom used, describes the cause of the injury, Fall in, On, or From Train. This second accident coding system has no comparable section in the DDDIC.

One would expect an increased number of diagnostic entities in the ICDA-8 resulting from incorporation into this newer disease classification of advances in knowledge about newly identified disease states. The Neoplasm section in the ICDA-8, for example, contains almost three times as many entities as are found in the DDDIC, and this expansion reflects increased knowledge about classification of neoplastic disorders. Overall, however, the ICDA-8 contains a few less diagnostic entities than does the DDDIC. This greater number of disease entities in the DDDIC is the result of a different manner of categorizing diseases. This different manner of categorization might be called a "splitting" approach, as opposed to a "lumping" approach. Using the former approach, multiple subtypes of a given disease are split apart and given separate code numbers.

In reviewing the different organizations of the two coding systems, problems in making a translation might be expected, and indeed significant problems did exist. Problems consistently encountered are outlined as follows:

1. A new disease entity is found in the ICDA-8. No corresponding entity exists in the DDDIC.

Example:

DDDIC Code Number	ICDA-8 Code Number	Disease Entity Designator
None	2680	Nutritional marasmus

No entity the same as, or similar to, Nutritional marasmus is found in the DDDIC.

2. The ICDA-8 fails to categorize a disease found in the DDDIC.

Example:

DDDIC Code Number	ICDA-8 Code Number	Disease Entity Designator
3330	None	Angiospasm of cerebral arteries

There is no disease entity in the ICDA-8 similar enough to be equated with, or grouped with, the DDDIC entity.

3. The ICDA-8 contracts groups of diseases or accidents which had been presented in expanded form in the DDDIC.

Example:

DDDIC Code Number	ICDA-8 Code Number	Disease Entity Designator
	8000	Fracture of skull vault/Closed
	8001	Fracture of skull vault/Open
	8009	Fracture of skull vault/Late effect
8000		Fracture of skull vault/Simple
8001		Fracture of skull vault/Simple but with delayed healing

DDDIC Code Number	ICDA-8 Code Number	Disease Entity Designator
8002		Fracture of skull vault/Open wound without mention of infection, foreign body or delayed healing
8003		Fracture of skull vault/Open wound with infection
8004		Fracture of skull vault/Open wound with foreign body
8005		Fracture of skull vault/Open wound with delayed healing
8006		Fracture of skull vault/Open wound with infection and delayed healing
8007		Fracture of skull vault/Open wound with foreign body and delayed healing
8008		Fracture of skull vault/Open wound with infection and foreign body, with or without delayed healing
8009		Fracture of skull vault/Late effects of injury

Thus, in the ICDA-8 there are only three entities describing skull fracture, while there are ten such entities in the DDDIC.

4. The ICDA-8 expands groups of entities which had been presented in more condensed form in the DDDIC.

Example:

DDDIC Code Number	ICDA-8 Code Number	Disease Entity Designator
2950		Coagulation defects/Hemophilia (no subtypes)

DDDIC Code Number	ICDA-8 Code Number	Disease Entity Designator
	2860	Coagulation defects/Hemophilia (four subtypes)
	2861	Coagulation defects/Christmas disease
	2862	Coagulation defects/Plasma thromboplastin antecedent deficiency
	2863	Coagulation defects/Vascular hemophilia
	2864	Coagulation defects/Hemorrhagic fibrinolysis
	2865	Coagulation defects/Circulating anticoagulants
	2869	Coagulation defects/Other

5. Terminology for similar diseases change so that they cannot be equated.

Example:

DDDIC Code Number	ICDA-8 Code Number	Disease Entity Designator
	5641	Function disorders of intestines/Irritable colon
5731		Functional disorders of intestines/Mucous colitis
5732		Functional disorders of intestines/Irritability of colon

The ICDA-8 Irritable colon and the DDDIC Irritability of colon are similar entities, but they are termed slightly differently. Further, it can be assumed that the ICDA-8's Irritable colon subsumes Mucous colitis, and thus

it is not the same as the DDDIC's Irritability of colon, which is distinguished from Mucous colitis.

6. A disease, or group of disease entities, in one ICDA-8 system may only be equated with the DDDIC entities found in another system.

Example:

DDDIC Code Number	ICDA-8 Code Number	Disease Entity Designator
	7710	Conditions of umbilical cord/ Compression of cord
	7711	Conditions of umbilical cord/ Prolapse of cord, no mention of compression
	7719	Conditions of umbilical cord/ Other
Y360		Conditions of umbilical cord/ Abnormal cord condition without mention of placental abnormality

The ICDA-8 entities are found in the system, "Certain Causes of Perinatal Morbidity and Mortality." The DDDIC entities are found in the system, "Supplementary Classifications for Special Cases, Live Births, and Fetal Deaths."

7. There are areas of marked incompatibility between diagnostic classifications for the same diseases within comparable systems. Such incompatibility usually represents a difference in philosophy regarding the nature of the disease entities.

Example:

DDDIC Code Number	ICDA-8 Code Number	Disease Entity Designator
	4000	Malignant hypertension/Without mention of organ damage
	4001	Malignant hypertension/With heart involvement

DDDIC Code Number	ICDA-8 Code Number	Disease Entity Designator
	4002	Malignant hypertension/With cerebrovascular involvement
	4003	Malignant hypertension/With renal involvement
	4009	Malignant hypertension/With multiple organ involvement
4410		Essential malignant hypertensive cardiovascular disease
4450		Essential malignant vascular hypertension

The example demonstrates quite different approaches to categorizing malignant hypertension. The ICDA-8 approach stresses a description of organ damage. It does not specify etiology of the hypertension. The DDDIC stresses that the hypertension is essential in nature, but it does not allow for a complete classification of organ damage.

Method

Since the main purpose for developing the translation between the two classification systems was use in computer assisted record review research, a number of criteria, consistent with this purpose, were established. The criteria were as follows:

1. The numerical sequence of the ICDA-8 was retained throughout the translation. The ICDA-8 is the newer and more complete coding method. The DDDIC disease entities might be taken out of their sequence to match the

sequence of the ICDA-8.

2. Equations were made between disease entities only when they were exactly, not approximately, the same.

Example

DDDIC Code Number	ICDA-8 Code Number	Disease Entity Designator
	0600	Yellow fever/Sylvatic
	0601	Yellow fever/Urban
	0609	Yellow fever/Unspecified
0910		Yellow fever/Unspecified type

It would be tempting to equate the ICDA-8 Yellow fever/Unspecified with the DDDIC Yellow fever/Unspecified type. Yet they are not the same, and the difference is an important one for epidemiological research. Assume, for instance, that there were 1,000 cases of Yellow Fever during a 3-year period of time during which the DDDIC was used and the same number of cases during a 3-year period during which the ICDA-8 was used. In the DDDIC system, the 1,000 cases would all be in the Yellow fever/Unspecified type category, but in the ICDA-8 they would be divided among the three types of Yellow fever.

3. When equations were made, they were made only between two corresponding entities. There were occasions when equating one disease entity from one classification to two or more entities from another would have at first seemed logical.

Example:

DDDIC Code Number	ICDA-8 Code Number	Disease Entity Designator
	4440	Arterial embolism and thrombosis/Of abdominal aorta

DDDIC Code Number	ICDA-8 Code Number	Disease Entity Designator
	4441	Arterial embolism and thrombosis/Of other aorta
	4442	Arterial embolism and thrombosis/Of mesenteric artery
	4443	Arterial embolism and thrombosis/Of rental artery
	4444	Arterial embolism and thrombosis/Of arteries of the extremities
	4449	Arterial embolism and thrombosis/Of other and unspecified arteries
4540		Arterial embolism and thrombosis/any artery except cerebral, coronary, pulmonary, mesenteric, puerperal

The DDDIC 4540 could be equated to the ICDA-8 group 4440, 4441, 4443, 4444, and 4449; however, doing so would collapse the ICDA-8 entities into one category which would rule out the possibility of comparing and contrasting the subtypes of the ICDA-8 category, Arterial embolism and thrombosis. If one were studying patients diagnosed only in the time period during which the ICDA-8 were used, one might be interested in how a sample was distributed among the six subtypes.

4. A system had to be devised so that the computer, or the human user, could rapidly find a disease entity and all closely related entities.

At the Naval Health Research Center (NHRC) a new code number was given to each disease entity. In most cases the new number designated either a DDDIC or ICDA-8 diagnostic entity for which no corresponding entity was found

in the other classification system. In some cases the new number designates disease entities from each coding system which have been equated.

Example:

DDDIC Code Number	ICDA-8 Code Number	NHRC Code Number	Disease Entity Designator
	5000	08-467-01	Hypertrophy of tonsils and adenoids/ Unspecified with regard to surgical treatment
5100		08-467-02	Hypertrophy of tonsils and adenoids/ Without mention of tonsillectomy or adenoidectomy
5101		08-467-03	Hypertrophy of tonsils and adenoids/ With tonsillectomy or adenoidectomy
5110	5010	08-468-01	Peritonsillar abscess/All types
5120	5020	08-469-01	Chronic pharyngitis and naso-pharyngitis/Chronic pharyngitis
5121	5021	08-469-02	Chronic pharyngitis and naso-pharyngitis/Chronic nasopharyngitis

The NHRC code numbers for Peritonsillar abscess and Chronic pharyngitis and nasopharyngitis refer to disease entities for which a direct translation was made between the entities in the DDDIC and the ICDA-8. On the other hand, the three NHRC code numbers describing Hypertrophy of tonsils and adenoids refer to the DDDIC and the ICDA-8 entities which could not be matched directly.

The above example demonstrates other important aspects of the NHRC coding system. The code number contains seven digits. The first two describe the system in which the disease entity is found; in this case the system is

Diseases of the Respiratory System. The next three digits describe the category. The last two digits describe the subtypes within a category. Disease entities with marked similarities will be combined within a category. A category may contain from one to a very large number of subtypes. The category is described in the Disease Entity Designator before the slash. Three categories are contained in the above example. The subtypes are described after the slash in the Disease Entity Designator.

5. A translation design must allow for periodic changes. Changes in the translation have been envisioned as periodic additions are made to the ICDA-8. The designers of the translation also had to take into account the possibility that changes would be made if mistakes were found. Each system of the translation was edited by a physician thoroughly conversant with the diseases within that particular system. Still it is possible that with use of the translation a small percentage of errors may be discovered. The seven digit NHRC code system allows for expansion or contraction so that changes can be made easily.

Results

The Naval Health Research Center translation of the DDDIC and the ICDA-8 classifications contains 18 systems, 999 categories, and 5,495 subtypes (entities describing diseases, accidents, symptoms, and abnormal conditions). Of the 5,495 entries, 924 are ones in which an exact equivalency was found to exist between an entity in the DDDIC and the ICDA-8 (observing the strict criteria for equivalency described previously). The different disease systems vary in the amount of equivalency found between the DDDIC and the ICDA-8.

These differences are presented in tabular form in Table 1.

Insert Table 1 about here.

The low percentages of equivalency for many disease systems in the Table reflect the many changes that occurred with the development of the ICDA-8.

The translation is one in which the problems described earlier have been satisfactorily resolved, and the five criteria previously described have been met. The translation is in routine use for epidemiological research at the Naval Health Research Center.

Summary

During the past decade the Medical Corps of the Armed Forces have used two different disease classifications. A way of conjoining the two systems into some type of translation has been needed. At the Naval Health Research Center such a translation has been needed for use in research. A translation has been made in a way that meets criteria important to the epidemiological researcher, and it has proved useful in ongoing epidemiological studies. The translation is available for use at other medical facilities. It should be helpful to clinicians, researchers, and medical administrators or librarians.

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Table 1

Disease System	Percentage of Equivalencies between DDDIC and ICDA-8 Entities
1. Infective and Parasitic Diseases	27
2. Neoplasms	27
3. Endocrine, Nutritional, and Metabolic Diseases	19
4. Diseases of the Blood and Blood Forming Organs	10
5. Mental Disorders	15
6. Diseases of Nervous System and Sense Organs	29
7. Diseases of Circulatory System	22
8. Diseases of the Respiratory System	28
9. Diseases of the Digestive System	26
10. Diseases of the Genitourinary System	23
11. Complications of Pregnancy, Childbirth, and the Puerperium	6
12. Diseases of Skin and Subcutaneous Tissue	43
13. Diseases of the Musculoskeletal System and Connective Tissue	19
14. Congenital Anomalies	9
15. Certain Causes of Perinatal Morbidity and Mortality	9
16. Symptoms and Ill Defined Conditions	90
17. Accidents, Poisonings, and Violence	8
18. Supplementary Classification -- Special Conditions	13

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